CHAPTER 1
Introduction

The population of the Kissimmee Basin Planning Area is expected to grow between 2000 and 2025 by nearly 150 percent, increasing to more than 1.1 million residents. Corresponding water supply and demand projections for the current 20-year planning horizon indicate traditional fresh groundwater and surface water sources will not continue to satisfy the region's water use. This 2005–2006 Kissimmee Basin Water Supply Plan Update supports the 2000 Kissimmee Basin Water Supply Plan (2000 KB Plan) findings and recommendations, which call for alternative water sources to supplement the region's existing water supply.

Working closely with the South Florida Water Management District (SFWMD or District), local governments and water suppliers play a key role in identifying the water supply projects that have been or will be incorporated into their local comprehensive plans. This 2005–2006 Kissimmee Basin Plan Update (KB Plan Update) incorporates current statutory requirements, outlines eligibility criteria for funding and provides regional project implementation strategies to planners, policy makers and utility directors.

The 2005–2006 KB Plan Update consists of this Planning Document, Appendices and a Consolidated Support Document. In addition, the accompanying CD contains electronic versions of this update package, as well as supporting studies, documentation, data and the previous 2000 KB Plan. This material is also available from the District's Water Supply Plan Web site at: http://www.sfwmd.gov/org/wsd/wsp.

PURPOSE

This 2005–2006 KB Plan Update addresses the anticipated water supply needs of the Kissimmee Basin Planning Area for the next 20 years and how these needs will be met through the development and funding of traditional and alternative water supplies (AWS). It identifies areas where traditional sources of water will not be adequate to meet future demands and presents viable water source options to meet future demands. In addition, this KB Plan Update contains a list of AWS projects for Fiscal Years 2006–2025. Projects listed in this plan are eligible for cost-sharing consideration through a separate annual funding process.

Revisions to Florida Water Laws

Section 373.0361(1), Florida Statutes (F.S.), The governing board of each water management district shall conduct water supply planning for any water supply planning region within the district identified in the appropriate district water supply plan under s. 373.036, where it determines that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for the planning period.

The legal authority and requirements for water supply planning are included in Chapters 373, 403 and 187 of the Florida Statutes. During the State of Florida's 2005 legislative session, lawmakers revised state water law. Several growth management-related bills were signed into state law and the Water Resource Protection and Sustainability Program was created. This program is intended to reduce competition for available water by encouraging the development of alternative water supplies, while still providing protection for the natural systems. Chapter 4 of the *Consolidated Water Supply Plan Support Document* (SFWMD 2005–2006) describes the Water Resource Protection and Sustainability Program.

The new statutory provision strengthens the link between regional water supply plans and the potable water provisions contained within each local government's comprehensive plan. The program is intended to ensure permitted water supply and potable water facilities are available for new development in a timely manner. All local governments within the Kissimmee Basin Planning Area are now required to prepare 10-Year Water Supply Facility Work Plans and adopt revisions to their comprehensive plans within 18 months following the approval of a regional water supply plan.

The Water Resource Protection and Sustainability Program and its accompanying trust fund allocate annual revenues to support alternative water supply development, such as desalination, use of reclaimed water and new storage capacity. These state funds, matched with water management district budgeted funds, are specifically for cost-sharing project construction costs for alternative water supply projects. The program also adds permitting incentives for water providers selecting projects recommended by the water supply plans.

Role of the South Florida Water Management District

The South Florida Water Management District (SFWMD or District) performs water supply planning for each region within its jurisdiction. The District's mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems and water supply. The agency serves local governments by supporting their efforts to safeguard existing natural resources and meet future water demands.

Regional Water Supply Plans

The SFWMD prepares water supply plans for each of its four planning areas to effectively support planning initiatives and address local issues. The regional water supply plans encompass a minimum 20-year future planning horizon and are updated every five years. Each regional water supply plan update provides revised water demand estimates and projections; an evaluation of existing regional water resources; identification of water supply related issues; a discussion of present water source options; water resource and water supply development components including funding strategies; and, recommendations for meeting projected demands for the region. In addition, the 2005–2006 KB Plan Update includes a discussion of minimum flows and levels (MFLs) established within the planning area; MFL recovery and prevention strategies where appropriate; technical data and support information.

PLAN GOAL AND OBJECTIVES

The SFWMD's strategic goal for all of its water supply planning efforts is to ensure an adequate supply of water to protect natural systems and to meet all existing and projected reasonable-beneficial uses, while sustaining water resources for future generations. Additionally, an objective of the 2005–2006 KB Plan is to identify sufficient sources of water to meet the needs of all reasonable-beneficial uses within the KB Planning Area for the year 2025 during a 1-in-10 year drought event, while sustaining the region's water resources and related natural systems.

2005–2006 Kissimmee Basin Plan Objectives

As part of the planning process, the public was asked to assist the SFWMD in defining the 2005–2006 KB Plan Update's objectives. At regional Water Resource Advisory Committee (WRAC) Issue Workshops, District staff and stakeholders developed the following objectives for this plan update, which provides an overall framework for the region's water supply planning process:

- Identify alternative water supply resources where deemed necessary.
- Protect natural systems from harm due to water uses.
- Provide options for a 1-in-10 year level of certainty for all reasonable - beneficial uses of water.
- Promote compatibility of plan with tribal and local government land use decisions.
- Promote compatibility and integration with other State and Federal regional water resource initiatives.
- Promote water conservation and efficient use of water resources.

- Refine water supply demand projections for average and 1-in-10 year level of certainty.
- Identify adequate funding to support identified water resource development and supply development projects.

Figure 1 shows the Planning Area in relation to the SFWMD and other water management districts.

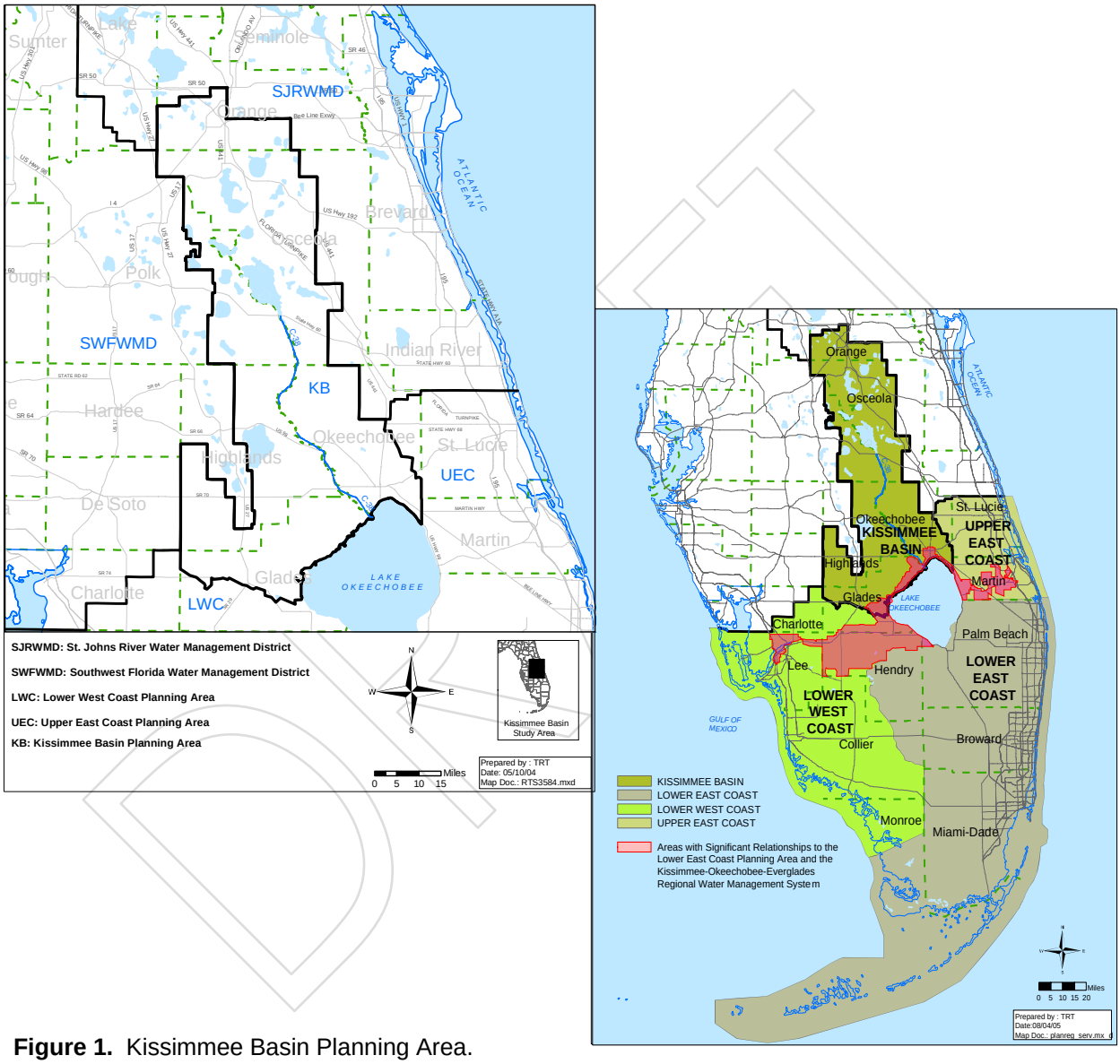

Figure 1. Kissimmee Basin Planning Area.

[@ Designer note: Place the following planning area facts around maps on map page]

The boundary of the Kissimmee Basin (KB) Planning Area generally reflects the drainage basin of the Kissimmee River. The KB Planning Area encompasses the portion of the SFWMD extending from southern Orange County, through the Kissimmee Chain of Lakes and the Kissimmee River, to the north shore of Lake Okeechobee. The area includes parts of Orange, Osceola, Polk, Highlands, Okeechobee and Glades counties. The northern and eastern portions of the boundary are adjacent to the St. Johns River Water Management District. And, the planning area's western boundary borders the Southwest Florida Water Management District. Orlando and portions of Orange County reside in multiple water management districts.

- The KB Planning Area is 3,490 square miles.
- Area population is expected to exceed 1.1 million by 2025 (U.S. Bureau of the Census 2001). Over 90 percent of this growth will be in the northern portion of the basin.
- The metro-Orlando area (Orange, northern Osceola and northeast Polk counties) is undergoing rapid urban growth.
- Moderate urban growth and increased agricultural activity is expected for Okeechobee, Glades and Highlands counties.
- Groundwater from the Floridan Aquifer is the primary source of water for the northern basin; and, surface water from Lake Istokpoga and Lake Okeechobee are the southern basin's traditional water sources.
- Alternative water sources include such sources as reclaimed water and surface water for the northern portion of the basin and additional groundwater from the Floridan Aquifer in the southern portion of the planning area.

Projections for 2025 indicate average annual water demand will increase 64 percent to approximately 430 million gallons of water per day (MGD). Urban related water demands during that timeframe will increase to 314 MGD with Public Water Supply surpassing Agriculture as the area's largest water consumer. Agricultural demands will increase only slightly from 115 MGD to 118 MGD overall. One in ten year drought water demands are projected to reach 524 MGD by 2025. County population data and related water usage is discussed in detail in **Chapter 2**, Demand Estimates and Projections.

PLANNING PROCESS

Planning efforts for the 2005–2006 KB Plan Update integrated development of 2025 demand projections; assessment of existing and projected resource conditions; and, formulation of strategies to meet urban, agricultural and environmental water needs. The SFWMD conducted analyses to measure the impacts of projected demands on available water resources and related natural systems within the southern portions of the planning area.

Public Participation

The process for development of the 2005–2006 KB Plan Update involved several public participation meetings and coordination with local governments and other agencies. The SFWMD established the Water Resources Advisory Commission (WRAC) to serve as an advisory body to the Governing Board. The WRAC is the primary forum for conducting workshops, presenting information and receiving public input on water resource issues affecting south Florida. Commission members represent environmental, urban and agricultural interests from all four of the District's water supply planning areas.

The SFWMD held Water Supply Plan WRAC Issue Workshops throughout the water supply planning process. A cross-section of regional stakeholders attended the WRAC workshops. Industrial representatives provided their review and comments for projected demands compiled by District staff. Meetings were also held by local government planning departments and utilities to discuss water demand projections and coordinate planning processes.

Coordination with Other Partners

The SFWMD also works in cooperation with the adjacent St. Johns River Water Management District and the Southwest Florida Water Management District. Jurisdiction boundaries of the three districts actually split the greater metropolitan Orlando area and multiple counties within the Kissimmee Basin.

Representatives of all three water management districts and the Florida Department of Environmental Protection (FDEP) attended several regional water supply workshops and subgroup meetings. Coordination between districts also occurs with water resource investigation, planning, regulation and water shortage declarations. A Memorandum of Understanding (MOU) between the three districts outlines terms of the agencies' formal collaboration, processes and agreements.

Seminole Tribe Agreement

The Seminole Tribe of Florida, the State of Florida and the SFWMD executed a Water Rights Compact in 1987. The Compact provides a framework for harmonizing the relationship between the Tribe, State of Florida and the District on issues concerning water resources. Of particular importance to the KB Plan are the Compact provisions concerning the Tribe's Brighton Reservation water entitlement.

The Brighton Reservation water entitlement was further detailed in an agreement, which was executed, by the Tribe and the SFWMD in November 1992, after publication of a District technical report. This agreement outlines surface water control strategies to assure maximum reliability of delivering the 15 percent water entitlement set forth in the Compact for the Brighton Reservation, which is located in Glades County. The Agreement also outlines the schedule of releases from Lake Istokpoga and operation schedules for the pumps at the S-71 and S-72 structures. The proposed development of the Southern Indian Prairie Basin Operation Plan has direct bearing on this agreement and is further explained in **Chapter 3**, Resource Analysis.

2000 PLAN ACCOMPLISHMENTS

In preparing the 2000 Kissimmee Basin Water Supply Plan (KB Plan), the planning process analysis identified key regional issues. These included a significant increase in demand for public water supply use in the northern portion of the basin, limitations placed on surface water withdrawals in the Indian Prairie Basin, and, potentially harmful environmental impacts to lakes, springs and wetlands.

To resolve these issues, the 2000 KB Plan contained seven strategies, which were organized into a series of recommendations and related project tasks. Responsibility for the development of each of the plan's projects required local and regional stakeholder participation.

Twenty-three of the 30 tasks outlined in the 2000 KB Plan were initiated during plan implementation. Five tasks were not implemented due to funding shortfalls or as new information rendered specific projects economically or technically infeasible. Major efforts initiated since development of the 2000 KB Plan include:

- Completion of the Regional Reuse Plan
- Evaluation of Storm Water Systems
- Surface Water Studies
- Floridan Aquifer Modeling
- Revision of the Operational Plan for the Indian-Prairie Basin
- Investigation of the Kissimmee River for Supply
- Investigation of Regional Storage Options

- Increased Regulatory and Planning Coordination Among Districts

The Five-Year Water Resource Development Work Plan, contained in the annual SFWMD South Florida Environmental Report, Volume II, summarizes the progress of these recommendations. As projects are completed or changed, information contained in the report also changes. **Appendix C** tracks all the projects as they were originally detailed in the 2000 KB Plan.

Reclaimed Water

Reclaimed water is expected to play an increasingly significant role in meeting future water demands of the Kissimmee Basin Planning Area. Central Florida is among the nationwide leaders in using reclaimed water for potable replacement and aquifer recharge.

Strategy 1.0 identified by the 2000 KB Plan addressed minimizing Floridan Aquifer drawdown through recharge within Orange, Osceola and western Polk counties. Recommendation 1.1 focused on reclaimed water use planning and consisted of three major components: development of a reuse plan, hydrologic investigations of the shallow aquifer and a pilot project involving direct injection of reclaimed water into the Floridan Aquifer System.

The 2005 Central Florida Regional Reuse Evaluation, completed by the SFWMD, concluded reclaimed water availability is projected to increase 98 percent for the study area by 2025 for a total of 244 MGD. Potential demand for reclaimed water for the same period is estimated to increase to an excess of 261 MGD. Nearly all reclaimed water providers have identified a plan to maximize their projected reclaimed use as part of their alternative supply strategy. Additionally, aquifer recharge was determined to be a beneficial use of reclaimed water in the central Florida area. The completed study also identifies, by utility, possible reuse demand, locations and system improvements that can help maximize reclaimed water use in the future. A copy of this report is included in **Appendix H**.

The second component of this effort involved investigating the connection of Surficial and Floridan aquifers in central Florida to gain greater insight into the benefits of reclaimed water use for aquifer recharge. This study also contributed to the District's understanding of the aquifer connection in the planning region. From 2002 to 2005 the SFWMD invested nearly $1.1 million to place a paired shallow and Floridan Aquifer wells at 32 sites. Each station contains continuous water level recorders monitored by the District.

The third element of the 2000 KB Plan Recommendation 1.1 was a feasibility assessment on the injection of potable quality reclaimed water into freshwater portions of the Floridan Aquifer. In 2002, the SFWMD conducted a Preliminary Assessment of Indirect Potable Reuse and Aquifer Injection Pilot Study, in partnership with Orange

County Utilities, at a cost of over $42,600. The study focused on the identification of regulatory and hydrologic concerns over indirect potable reuse and provided preliminary design of a nano-filtration and UV treatment system for further investigation. This study led to a follow-up pilot study of the proposed treatment process initiated by Orange County.

Storm Water

Recommendation 1.2 was related to storm water reuse, which like reclaimed water, could potentially offset fresh water withdrawals from the Floridan Aquifer. Efforts undertaken for the Kissimmee Basin Planning Area included evaluations of the regional stormwater drainage systems; the regulatory, water quality and recharge aspects of drainage wells; and, alternative treatment methods for storm water entering drainage wells.

From 2001 through 2003, the SFWMD participated in an Artificial Recharge Project, led by the St. Johns River Water Management District, which reviewed passive treatment options for lake and street drainage wells. The project also studied methods for maximizing recharge through infiltration basins. Initial results showed bacterial components rapidly disappeared, but other chemical components, including arsenic, had longer residence times. The SJRWMD has made progress in monitoring the fate of chemical and biological contaminate concentrations of injected stormwater drainage wells and is continuing ongoing water quality monitoring for the project.

Also, in 2002, the SFWMD initiated a survey of stormwater drainage wells with the SJRWMD and Orange County Utilities. The purpose of the study, completed in February 2003, was to create a GIS-based inventory and database of information on central Florida's 300 plus drainage wells. Many of the wells have been in place since the 1960's and they provide an estimated 20 MGD of aquifer recharge. A local consulting firm inspected the wells and completed an inventory of the drainage wells located in Orange, Seminole, Lake and Osceola counties. This inventory was also used to address needed maintenance issues on some wells and helped identify potential sites for the storm water treatment portion of the study.

In 2004 and 2005 the Nashville Street drainage well was selected as the site for testing a combined storage area and storm-scepter ™ concept to improve water quality. The construction, done in conjunction with Orange County, was completed in 2005. Water quality sampling is ongoing by the county to determine possible water quality improvements resulting from the installation.

Conservation

The 2000 KB Plan's Strategy 2.0 and its corresponding Recommendation 2.1 relate to conservation. In 2002, the District established an organizational unit within its Water Supply Program to address water conservation initiatives. This new division

manages the Alternative Water Supply Funding Program, Mobile Irrigation Labs and the Water Savings Incentive Program (WaterSIP). The WaterSIP funds local conservation initiatives, such as weather station irrigation controllers, toilet retrofit and outreach programs.

The Alternative Water Supply (AWS) Grant Program was opened to the Kissimmee Basin Planning Area in 2003. Over $2 million in project funding has been awarded since the program's inception. Although the staff has worked with utilities to identify opportunities for water conservation through both the conservation and regulatory divisions of the SFWMD, no grants have been provided for tracking of the development of individual water conservation plans.

District staff members are actively involved in the Florida Water Conservation Initiative led by the Florida Department of Environmental Protection. And, the SFWMD continues to participate on the Statewide Reuse Coordinating Committee to discuss statewide reuse issues.

Surface Water

The SFWMD conducted evaluations of Lake Tohopekaliga, East Lake Tohopekaliga and its tributaries, Boggy and Shingle Creeks, all part of the Kissimmee Chain of Lakes system. The study, which provides a preliminary estimate on the availability of supplies from the system, was completed in 2005. Results of the study suggest significant volumes of water might be withdrawn from the Kissimmee Chain of Lakes, while causing limited changes to the identified environmental criteria. The findings also show this source is drought prone and development of storage is likely an important component of source reliability. Shingle and Boggy Creeks are slightly more reliable sources potentially yielding and average of 6 MGD and 4 MGD respectively. An Executive Summary of these studies is located in **Appendix I.**

In a related project, the SFWMD sponsored the Toho Water Authority's efforts to develop water supplies from Shingle Creek as a supplemental source of reclaimed water in 2003, 2004 and 2006. Estimated water generated from this effort is 4.0 MGD. District funding exceeded $1.1 million dollars for the project during fiscal years 2003 through 2006.

Beginning in 2003, the SFWMD entered into an agreement with the City of Kissimmee (later the Toho Water Authority) to construct facilities to withdrawal up to 4 MGD from Shingle Creek for use in reuse augmentation and groundwater recharge. The District also sponsored this project in 2004 through 2006. The project is scheduled to be complete and online in 2006.

Additionally, following 2000 KB Plan recommendations, the SFWMD coordinated efforts with the St. Johns River Water Management District to investigate water resource development opportunities using surface water supplies from the St. Johns

River. The largest of these projects is the St. Johns River / Taylor Creek Project, which is estimated to supply 45 MGD.

Groundwater Resources

The SFWMD budgeted over $3 million dollars (fiscal years 2000 through 2006) for the construction and testing of a series of wells designed to obtain new information on the Floridan Aquifer System in central Florida, particularly the lower portion of the aquifer. Thirteen wells were constructed and tested in the Floridan Aquifer. Six of the wells were constructed into Lower Floridan Aquifer. These sites were constructed in cooperation with Reedy Creek Improvement District, Orange County, Orlando Utilities Commission and the SJRWMD.

Alternative Water Resources

Part of Strategy 3.0 of the 2000 KB Plan recommended the investigation of surface water bodies within the planning area to determine the availability from these sources. See the discussion of the evaluations of Lake Tohopekaliga, East Lake Tohopekaliga and its tributaries, Boggy and Shingle Creeks under the preceding Surface Water section for more information on this accomplishment. Continued efforts to evaluate the potential availability of these sources have been combined with the SFWMD's effort to modify its management plan for the Kissimmee Chain of Lakes.

In the 2000 KB Plan, Strategy 4.0 and its related recommendations prescribed pursuit of water resource development solutions involving water supplies originating from Lake Okeechobee and the Kissimmee River. Strategy 5.0 addressed development of a water management plan for the Lake Istokpoga–Indian-Prairie Basin.

The revised operational plan for backpumping water from Lake Okeechobee into the lower Indian-Prairie Basin is under development. Investigation of the Kissimmee River as an alternative water resource was combined with efforts to model the Kissimmee River system currently underway as part of the Kissimmee Basin Hydrologic, Modeling and Operations Study (KBMOS) Study.

Lake Istokpoga had been identified as a water source to supply expanding agricultural demands in the southern portion of the Kissimmee Basin Planning Area. As one of the recommendations of the 2000 KB Plan, the SFWMD performed a comprehensive evaluation of the lake basin resources to devise an improved operations plan to improve water supply deliveries. Additionally, the SFWMD installed two new water level monitoring stations on Lake Istokpoga at a cost of approximately $60,000. These stations will improve the District's ability to monitor lake levels and make operational decisions based on this information.

Related Implementation Strategies

Each year the District updates the list of priority water bodies for the establishment of Minimum Flows and Levels (MFLs). In December 2005, the SFWMD adopted an MFL for Lake Istokpoga. The most recent MFLs priority list postponed the setting of MFLs for the Kissimmee River, Lake Kissimmee, Cypress Lake, Lake Rosalie, Lake Marion, Lake Jackson and Lake Hatchineha to beyond 2010. The lack of existing or immediately projected consumptive use demands indicated it was appropriate to delay establishing these MFLs. Setting a minimum level for the Floridan Aquifer in central Florida was postponed indefinitely to allow for the gathering of additional information to specify such an MFL.

Another recommendation from 2000 involved a review of surface water storage options, such as a regional reservoir or Stormwater Treatment Area (STA), to improve water supply dependability within the Indian-Prairie Basin in Glades and Okeechobee counties. The SFWMD's regulatory staff worked with individual farmers to create storage areas to retain water on specific sites. Work on a regional reservoir was deferred until the Lake Okeechobee Watershed Project (LOWP), led by the U.S. Army Corps of Engineers, identifies a suitable location for the reservoir north of Lake Okeechobee.

Regulatory and Inter-District Coordination

Recommendations based on strategies 6.0 and 7.0 in the 2000 KB Plan emphasized the need for better coordination. A Memorandum of Understanding (MOU) between the SFWMD and the Kissimmee Basin's neighboring water management districts the SJRWMD and SWFMWD has been in place since 2000. The MOU was updated in 2003.

SUMMARY

The 2005–2006 Kissimmee Basin Plan Update represents an update to the 2000 Kissimmee Basin Plan. Many of the objectives of the 2000 KB Plan were met and helped in the development of this plan update. Since the initial development of the 2000 KB Plan, several legislative changes have occurred to link the findings of subsequent planning efforts to local government comprehensive planning efforts. Most notably the development of a Ten-Year Water Facility Work Plan required within 18-months after the completion of this plan update.

REFERENCES CITED:

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South Florida Water Management District. 2005–2006. *Consolidated Water Supply Plan Support Document*, Water Supply Department, SFWMD, West Palm Beach, FL. vari. pag.

CHAPTER 2
Demand Estimates and Projections

The Year 2025 was identified as the planning horizon for the assessment of water use impacts. By the end of this 20-year water planning timeframe, average water demand is projected to increase 64 percent. In 2000, the total estimated water use for the Kissimmee Basin (KB) Planning Area was approximately 263 million gallons per day (MGD). Current trends indicate average water demand will reach 432 MGD by 2025. Agriculture, historically the region's largest water user, will soon be surpassed by Public Water Supply as the area's population continues to increase and agricultural lands decrease. This significant shift in water demand poses several challenges for water supply planners, especially since water supply available for use from the region's traditional resources is scarce.

The term "estimate", as used in this document, refers to information gathered from reported public water supply use and calculated water use for all other water usage categories. "Projections" refer to calculations used to forecast numbers for future time periods based on estimated land use and population forecasts.

The estimations of baseline and projected water use information are important steps in assessing the impacts from increases in traditional water use. Establishing a baseline period allows for the collection of water use records and estimation of unit rates of use to make projections. Year 2000 served as a baseline for the 2005–2006 Kissimmee Basin Water Supply Plan Update (KB Plan Update), as well as for the planning efforts of the St. Johns River Water Management District (SJRWMD) and the Southwest Florida Water Management District (SWFWMD).

1-in-10 Year Drought Condition

A l-in-10 year drought condition is defined as below normal rainfall with a 90 percent probability of being exceeded over a 12-month period. This means there is a 10 percent chance that less than this amount will be received in any given year. Subsection 373.0361(2)(a)l, Florida Statutes (F.S.), states the level of certainty planning goal associated with identifying demands shall be based on meeting demands during a l-in-10 year drought event.

DEMANDS BY WATER USE CATEGORY

Total water demand for the Kissimmee Basin (KB) Planning Area is projected to increase by approximately 169 million gallons of water per day (MGD) to 432 MGD. The region's more heavily populated Orange and Osceola counties will continue to require a majority of the public water and domestic self-supplies. And, as urban development displaces additional farmland, agricultural activities will be concentrated in the Lower Kissimmee Basin.

Water Use Categories

Public Water Supply refers to all potable (drinking quality) water supplied by water treatment facilities with projected average pumpages for 2025 greater than 100,000 gallons per day (GPD) for all types of customers. The remaining water use categories are all self-supplied.

The **Domestic Self-Supply** category includes households served by small utilities and/or private wells.

Agriculture water is used for crop irrigation, cattle watering and aquaculture.

Commercial and Industrial are business operations using a minimum water quantity of 100,000 GPD.

Thermoelectric Power Generation water is consumed by power plants in the production of electricity.

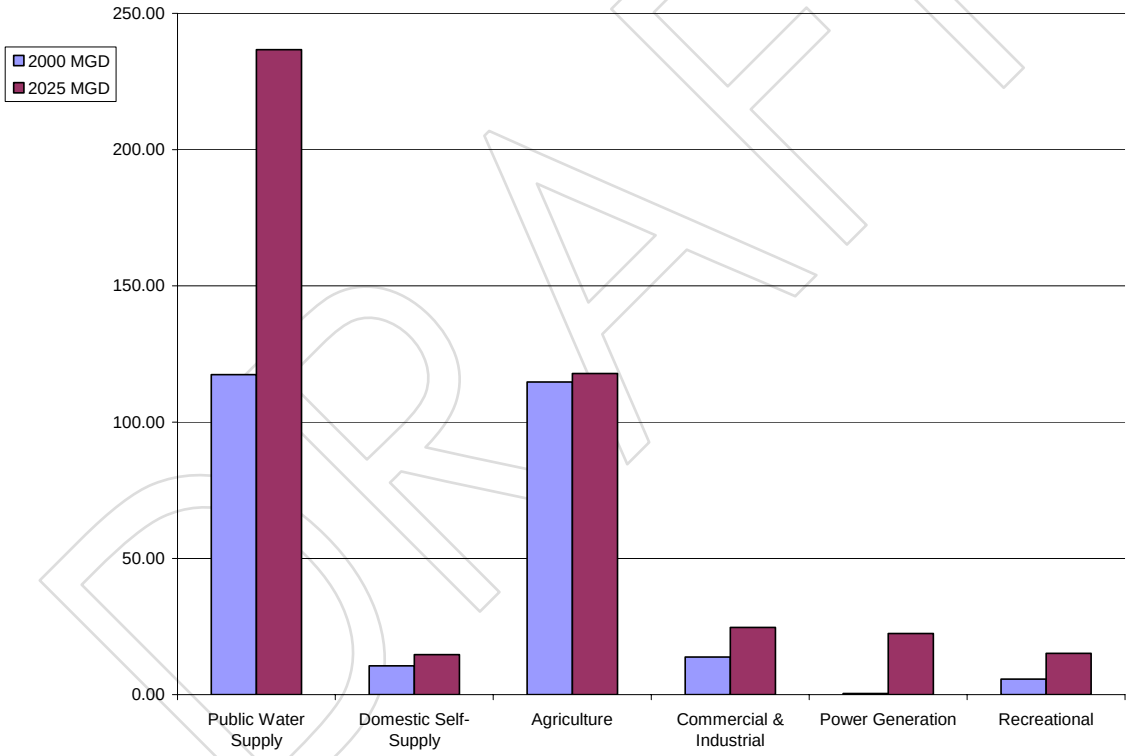
Recreational water use includes golf course irrigation demand. The Landscape subcategory includes water used for parks, cemeteries and other self-supplied irrigation uses with demands greater than 100,000 GPD.

Water usage demand estimates for 2000 and projections for 2025 were made for six water supply categories—Public Water Supply, Domestic Self-Supply, Agricultural use, Commercial and Industrial, Thermoelectric Power Generation Self-Supply and Recreational and Landscape Self-Supply. Key points include:

- Basin-wide, the demand for Public Water Supply is expected to double by the Year 2025. This water supply category will represent approximately 55 percent of the region's total water supply use.
- Agricultural water use is projected to show modest overall growth of about three percent; and remain the second largest consumer of water in the Kissimmee Basin.

- Thermoelectric Power Generation self-supply will experience the greatest percentage increase as a single water use category. Future demand projections reflect the additional 22 million gallons of water per day required by Florida Power & Light's new power plant.
- The remaining water use categories—Domestic self-supply, Commercial and Industrial, Recreational and Landscape—will also experience increased demand totaling almost 13 percent of water usage by 2025.
- The implications of the area's water usage changes require a commitment to a coordinated water planning effort.

Figure 1 shows the water demands by use category.



	Public Water Supply	Domestic Self-Supply	Agriculture	Commercial & Industrial	Power Generation	Recreational	Total
Estimated 2000 MGD	117.41	10.60	114.75	13.83	0.46	5.71	262.76
Projected 2025 MGD	236.65	14.70	117.86	24.71	22.46	15.13	431.51
% Change MGD	102%	39%	3%	79%	4783%	165%	64%

Figure 1. Water Demands by Use Category (MGD).

POPULATION AND WATER SUPPLY USE TRENDS

The region's population is expected to increase nearly 150 percent from 2000 to 2025. As indicated in the following table, Orange and Osceola counties will experience the greatest rates of growth. **Table 1** provides a summary of the population estimates for the six counties located in the KB Planning Area. The distribution of population estimates is based on University of Florida Bureau of Economic and Business Research (BEBR) values distributed using traffic zone analyses and utility service areas. The previous table in **Figure 1** provides a summary of the change in average water demand use between 2000 and 2025 for all water supply categories.

Table 1. Population in the KB Planning Area, 2000–2025.

County Area	2000			2025		
	Total	Public Water Supply	Domestic Self-Supply	Total	Public Water Supply	Domestic Self-Supply
Southern Orange	220,065	216,508	3,557	513,619	488,657	24,962
Western Osceola	171,416	152,180	19,236	517,000	495,752	21,248
Eastern Polk	14,518	6752	7,766	20,826	9307	11,519
Eastern Highlands	7,636	1,722	5,914	10,794	2,168	8,626
Northern Glades	3,665	2,529	1,136	4,956	3,324	1,632
Western Okeechobee	33,321	19,742	13,579	43,055	28,557	14,498
Total Planning Area	450,621	399,433	51,183	1,110,200	1,027,765	82,485

Source: U.S. Bureau of the Census, 2001 and University of Florida Bureau of Economic and Business Research, 2005.

Public Water Supply and Domestic Self-Supply

[@ This section should discuss both the population growth and its influence on water demand. However, this section only discusses population – need to add discussion on water demand.] The population of Orange County is expected to more than double over the next two decades; and, Osceola County's population will triple during the same time period. Combined growth for Glades, Okeechobee and Highlands counties is anticipated at a nearly 30 percent increase.

Public water supply and domestic self-supply water use are tied to estimates and projections of permanent resident population and historical per capita water use rates. With the increase in the full time resident population, seasonal fluctuations have less impact on overall water demand. County level estimates and projections of population for all counties are consistent with the 2000 Census of population and medium population

projections from the University of Florida, Bureau of Economic and Business Research (BEBR).

The urban demand assessment for public and domestic self-supplied water usage incorporated median population data from the U.S. Bureau of the Census and BEBR for all counties in the region with the exception of Western Osceola County. Consistent with the requirements of Subsection 373.0361(2)(a), Florida Statutes (F.S.), the South Florida Water Management District utilized the county's BEBR high value estimate for its population. The county received authorization from the Florida Department of Community Affairs (FDCA) to use the high BEBR estimate for its population as supported by that local government's comprehensive plan.

All projections were coordinated with the utilities and their local government comprehensive plan population projections, using the best information available. Estimates for public and domestic water use were developed based on Year 2000 per capita use rates by utility and the distribution of BEBR population estimates into and outside of utility service areas using GIS techniques.

Conservation measures were not factored into the demand projections used in this chapter. Rather, conservation is considered a water source option and discussed in **Chapter 5**.

Agricultural Water Use

Agricultural water use demand reflects projected acreage, crop types, growing seasons, irrigation system types, soils and irrigation strategies. While the agricultural water use category is expected to change from 44 percent of current total water supply to 27 percent by 2025, this water use category will increase slightly and be the second biggest water user in the region. Estimated demand for agricultural water use is projected to rise three percent to an estimated 118 MGD. Residential development, environmental restoration, loss of citrus acreage to past freezes and disease are some reasons for the decline in irrigated agricultural acreage.

Economic forecasting for agricultural areas rapidly transitioning to urban use has been an added challenge for water planners. The 2005–2006 KB Plan Update estimates of new agricultural operations are more conservative than those created for the 2000 Kissimmee Basin Water Supply Plan (2000 KB Plan). Agricultural acreage growth trends (particularly citrus in the southern half of the Kissimmee Basin) have flattened in recent years. This trend was not observed at the time of the 2000 KB Plan. For example, the projection for irrigated agricultural acreage in the 2000 KB Plan anticipated a significant increase in citrus acreage (the dominant crop in the region), whereas this 2005–2006 KB Plan Update anticipates a modest decline. Additionally, in 2000, there were several agricultural corporations in the region indicating significant expansion plans for vegetable and row crops; however, as of this update, these plans have not been fully executed.

Agricultural self-supply demand calculations for the 2005–2006 KB Update were made using the Agricultural Field Scale Irrigation Requirement Simulation (AFSIRS) Model. Change from the use of the Blaney-Criddle method to AFSIRS was made because AFSIRS was regarded by staff to more accurately predict actual water use. The AFSIRS model can be used to predict gross and net irrigation requirements. The gross demand values were used to address soil and irrigation system impacts on water use. Estimates for pasture irrigation were not included in the total demand estimates, as water for this type use is thought to not typically be used during 1-in-10 year drought conditions. These changes from the 2000 KB Plan caused the overall water use estimated for agricultural water use to be reduced for the plan update.

Commercial and Industrial Self-Supply

Commercial and industrial use is expected to keep pace with urban growth, but this growth is expected to be served primarily by local utilities. Data for the 2000 demand estimates for this use category was collected from consumptive use permit reporting and represents self-supply activities not served by a local utility.

Year 2025 demand projections are approximately 25 MGD, a 79 percent increase from 2000 commercial and industrial water use in the region. However, in total, this water usage category will represent only 6 percent of the total projected water demand in the region. Projected water use in this category is significantly higher than estimated in the 2000 Kissimmee Plan. This revised projection represents a number of new industrial projects previously not identified or permitted.

Thermoelectric Power Generation Self-Supply

The Kissimmee Basin's need for additional power supplies is expected to grow as its population expands. Florida Power & Light, the region's largest power utility, plans to use more fresh or brackish water in its new plant's cooling technology. Florida Power & Light's power plant, located in Okeechobee County, will withdraw water from Lake Okeechobee or a regional reservoir. As mentioned earlier in this chapter, water use for power generation demands will grow to 22.5 MGD by 2025, up from .5 MGD demands in 2000. Florida Power & Light's projected water supply needs represent the entire usage increase reported for this category.

Recreational Self-Supply

Recreational self-supply water usage projections primarily include water demands for golf course irrigation and are typically identified through their consumptive use permits. Landscape irrigation demand projections are included with this category. Recreational and landscape use is expected to keep pace with urban growth, but most of this new growth is expected to be served with reclaimed water.

Demand for golf course irrigation is expected to exceed 15 MGD, a 155 percent increase [@ see Figure 1 – is 10% of the 165% for landscape?] in use, by 2025. In recent years, as the value of land has increased in central Florida, developers have converted several older golf courses into new residential communities. This trend is projected to continue in certain areas, but related water use changes are projected as minimal (and are captured within the public water supply demand category).

SUMMARY

Demand projections are based on the extrapolation of trends, circumstances and industry intentions that change over time. For example, observed and projected growth in citrus acreage during the preparation of the 2000 KB Plan has since reversed into a decline. While there have been acreage increases in ornamental nurseries, it is not equivalent to the reduction in citrus acreage. Trend changes such as this are incorporated in the five-year updates to the plan.

In summary, the major driving force behind the significant growth in water demands reflected in the 2005–2006 KB Plan Update is the region's anticipated population growth. Most of this growth, in absolute terms, is expected to take place in the portions of Orange and Osceola counties, which lie within the planning area.

People demand potable water and this demand is met by public water supply and domestic self-supply. They also demand water for irrigation of urban landscapes and recreational areas, such as golf courses. Additional population also leads to the formation of new businesses and more power generation.

For the 25-year period from 2000 to 2025, the planning area population growth of 660,000 is twice that projected in the 2000 KB Plan, which estimated a population growth of 324,000 from 1995 to 2020. The 2005-2006 KB Plan Update predicts a 25-year growth in urban demands of almost 166 MGD. The previous plan forecasted 89 MGD for 1995 to 2020. Clearly, an unanticipated and dramatic surge in demand has occurred and is projected to continue in the immediate future.

In contrast to the urban demand increases, a modest 3 MGD growth in agricultural water use is projected in this plan update. The 2000 KB Plan estimated 168 MGD in agricultural growth due to trends at that time. This change is due primarily to reduction or elimination of projected acreage from the previous plan. This previously projected growth largely took place in the southern portion of the planning area. In addition, agricultural demands are lower in this plan update because the present method of estimating demands (AFSIRS based) generally gives lower estimates of irrigation requirements than the previously used Blaney-Criddle method.

Appendix D provides a full description of the methods used to estimate water use for each major usage category.

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University of Florida. 2006. *Florida State and County 2005 Estimate and 2005-2030 Projections*. Bureau of Economic and Business Research, University of Florida, Gainesville, FL.

CHAPTER 3
Resource Analysis

This 2005–2006 Kissimmee Basin Plan Update provides an overview of supply sources, (KB Plan Update) describes ongoing modeling efforts and studies; and, identifies resource protection mechanisms, which meet the 1-in-10 year level of certainty standard required by state law.

OVERVIEW OF SUPPLY SOURCES

Surficial Aquifer System

The Surficial Aquifer System (SAS) in the northern Kissimmee Basin is low yielding. Moreover, the quality of water in this aquifer system is poor. Additional constraints on use of this source include the fact that this system interacts with natural features such as isolated wetlands, baseflows to slough systems, and potentially with lake systems. The SAS, therefore, has limited potential to satisfy large-scale demands. However, one of the major functions of the SAS is to provide recharge to the Floridan Aquifer System (FAS), particularly in the western portion of the Northern Kissimmee Basin. However, this function does not occur in the eastern half of the Northern Basin, where the SAS is hydrologically isolated from the FAS due to the occurrence of low permeable clays and sediments within the Hawthorne Group. Thus, withdrawals within the FAS do not readily affect surficial features, such as lakes and wetlands, unless a connection exists.

Floridan Aquifer System

The FAS is a high yielding aquifer which provides substantial volumes of good quality water to a wide variety of use classes within Central Florida. The FAS is currently the sole source of potable quality water within the northern Kissimmee Basin. The FAS also currently provides the majority of supply for human demands occurring within central Florida. [@ Insert discussion on the presence of salt water front on the east and the limitation it presents on availability.] The FAS also meets important environmental needs.

The FAS is confined throughout much of central Florida. In areas immediately north and east of the SFWMD's boundaries, the confined pressures within the aquifer are sufficient to cause the aquifer levels to exceed land surfaces. Within the SJRWMD, these conditions manifest themselves as free-flowing springs. The FAS is confined by the Hawthorne Group. These confining beds thin and become discontinuous in the western portion of the northern basin where the SAS provides recharge to the FAS. Also, there

are wetland systems and lake systems that have a high degree of connection to the Floridan Aquifer. In these regions, withdrawals from the FAS have the potential to impact natural systems. Thus, the FAS also interacts with environmental features.

One method of offsetting the effects of withdrawals on environmental features is to provide increased recharge to the FAS. One area where this occurs is in the western portion of this basin. One method for this recharge to occur is rapid infiltration basins (RIBs). These RIBs provide treated wastewater recharge to the SAS and FAS. Studies have documented that recharge of the SAS has resulted in raising groundwater levels within the FAS as a result of this recharge phenomenon. Opportunities exist within this area to expand this use recharge concept. Utilization of this recharge concept also provides the benefit of minimizing impacts to wetlands. Conversely, withdrawals from the FAS in areas where withdrawals exceed recharge capacity of the Surficial Aquifer can lower levels within the SAS within the area where lakes and wetlands occur and have the potential to cause harm to environmental resources including lakes, springs, and wetland hydropatterns

Over the years, concentrated withdrawals by users within all three water management districts in central Florida have resulted in declining groundwater elevations within the FAS in a broad area within the region. These declines are occurring as a result of rapid growth and the associated increase in use of the FAS in central Florida. Declines in water levels within the FAS have the potential to impact environmental features in these areas including springs, wetlands and lakes. Moreover, declines in the FAS have the potential to cause movement of the saltwater front located in the eastern portion of the northern Kissimmee Basin.

WATER RESOURCES

The hydrogeology of the Kissimmee Basin consists of three major hydrogeologic units: the Surficial Aquifer System (SAS), the intermediate confining unit and the Floridan Aquifer System (FAS) as shown in **Figure 1**. The region's water quality deteriorates, becoming more brackish, as it moves south and east. Chapter 6 of the *Consolidated Water Supply Plan Support Document* (on the enclosed CD) discusses the aquifer systems, hydrogeologic units and aquifer yields for this region in greater detail.

This discussion of the Kissimmee Basin Planning Area's water resources distinguishes between its northern and southern regions. The northern basin is primarily influenced by urban driven demands, while the southern basin is agriculture demand driven. The northern basin consists of those entities that contribute to the groundwater depression occurring in the Upper Floridan Aquifer in central Florida, including sections of Orange, Osceola and Polk counties located in the SFWMD's jurisdiction. The southern basin generally refers to areas south of Lake Kissimmee, including Okeechobee, Highlands and Glades counties.

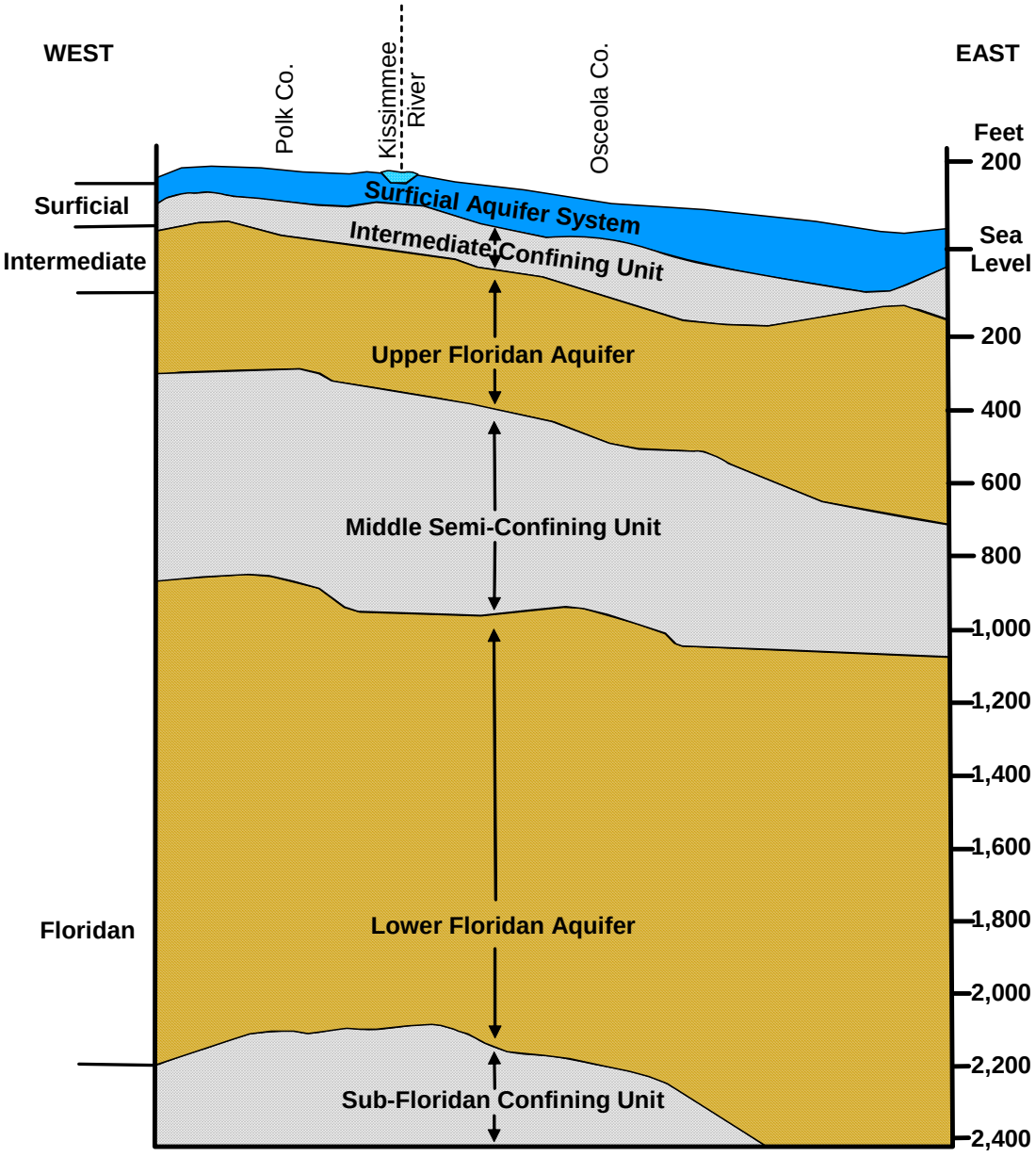

Figure 1. Generalized Geologic Cross-Section of the Kissimmee Basin Planning Area.

Traditional sources of water for the northern basin are the upper and lower portions of the Floridan Aquifer System (FAS). Water quality in the FAS is generally very good, but concentrations of chloride and total dissolved solids increase in eastern Orange and Osceola counties. The Surficial Aquifer System (SAS) is not a viable alternative water source due to low production rates and poor water quality. In the western sections of the planning region and into Polk County, the water quality and productivity of the Lower Floridan Aquifer System deteriorates.

Surface water from Lake Istokpoga and Lake Okeechobee are traditional water sources for Okeechobee, Glades and Highlands counties in the southern portion of the

planning region. While groundwater from the Upper Floridan Aquifer System is available for use, water quality deteriorates closer to Lake Okeechobee. In addition, the Lower Floridan Aquifer is comprised of saline water throughout the southern basin, with exceptions in the northwestern portion of Highlands County.

NORTHERN KISSIMMEE BASIN ASSESSMENT.

Spring Discharge Evaluation

Although there are no natural springs located within the Kissimmee Basin, several environmentally critical springs are located just outside of the SFWMD's boundary, in the Wekiva Basin in northern Orange County. These springs contribute to the base flow of the Wekiva River and several of its tributaries. The St. Johns River Water Management District has established minimum flow values for eight Wekiva Basin springs. Estimated spring flow requirements are based, in part, upon environmental demands of Wekiva River and its tributaries.

Lake Wales Ridge Lake Level Evaluation

The Southwest Florida Water Management District has determined several lakes located along the Lake Wales Ridge are stressed. These lakes lie west of the KB Planning Area, within a Water Resource Caution Area in the Southwest Florida Water Management District jurisdiction. Lake level protection criteria were identified to address the SWFWMD's concerns over declining lake levels in 2000. This criteria remains unchanged as of 2006.

The SWFWMD recently established MFL's for eight lakes along the Lake Wales Ridge extending from Polk County to Highlands County. Additionally, the SWFWMD established a set of Floridan Aquifer monitoring wells to assist assessment of potentially adverse aquifer levels threatening the lakes.

SOUTHERN KISSIMMEE BASIN ASSESSMENT

A new, upgraded groundwater model was created replacing the Glades, Okeechobee and Highlands model developed for use in conjunction with the 2000 KB Plan. The Lower Kissimmee Basin (LKB) Groundwater Model includes all of Okeechobee and Highlands counties and most of Glades County. It also includes portions of Polk, Osceola, Indian River, St Lucie, Martin, Palm Beach, Charlotte, DeSoto and Hardee counties.

The LKB Groundwater Model is a four-layer, steady-state MODFLOW model. The new model revisits the aquifer structure in the area as a result of the recent investigations conducted in south Florida. The model will be used to evaluate the effects

of projected increases in groundwater withdrawals from the Upper and Middle Floridan aquifers.

Water demands for uses within the SFWMD portions of Glades, Okeechobee and Highlands counties is projected to show only minimal increase before 2025. Modeling simulations of projected groundwater withdrawals within these counties show only minor changes in the Floridan Aquifer levels. For the purpose of this analysis, groundwater demands for the SWFWMD were kept at their 1995 withdrawal rate consistent with efforts by the SWFWMD to limit further net use of Floridan Aquifer. Increases in withdrawals were modeled within the SFWMD. Demands outside the District were not included in this modeling effort. Interpretation of the results from this base model simulation do not suggest concerns with future increases in groundwater use in the model domain through 2025 for lakes located along the Lake Wales Ridge portion within Highlands County.

The Heartland Water Alliance (HWA)—representing Highlands, Desoto, Hardee and Polk Counties have identified several possible wells for location within the SFWMD that would be used to meet water demands within the SWFWMD. The proposed wells would deliver an estimated 9 million gallons of water per day. While these wells are recognized for potential use, the use of these wells were not included within the KB planning demands, but should be recognized as potentially impacting use of groundwater within the SFWMD.

Lake Istokpoga–Indian Prairie Basin Analysis

The Lake Istokpoga–Indian Prairie Basin is defined as those areas with access to the C-40, C-41, C-41A canals on Lake Istokpoga, either directly or via other canals. **Figure 2** shows the features of the Indian Prairie Basin. The District's regulatory program, supported by earlier evaluations and historic operations, established a level of water use from Lake Istokpoga to where sufficient supplies were available to meet the then current demands. As a result, new uses of surface water in the Lake Istokpoga–Indian Prairie Basin have been restricted.

As documented in the 2000 KB Plan, an evaluation of water use deliveries from Lake Istokpoga to the Indian Prairie Basin showed projected surface water demands for 2020 could potentially be met by a combination of water resources. Proposed water supply solutions included increased water releases from Lake Istokpoga, reduction or removal of required releases for canal maintenance and back pumping of water from Lake Okeechobee via the G-207 and G-208 surface water pumps.

The 2000 KB Plan recommended development of an operational plan for Lake Istokpoga and Lake Okeechobee to manage water deliveries to the Indian Prairie Basin from these two sources.

Proposed changes to the Lake Okeechobee regulation schedule and issues related to the Herbert Hoover Dike have created uncertainty concerning water availability for new demands.

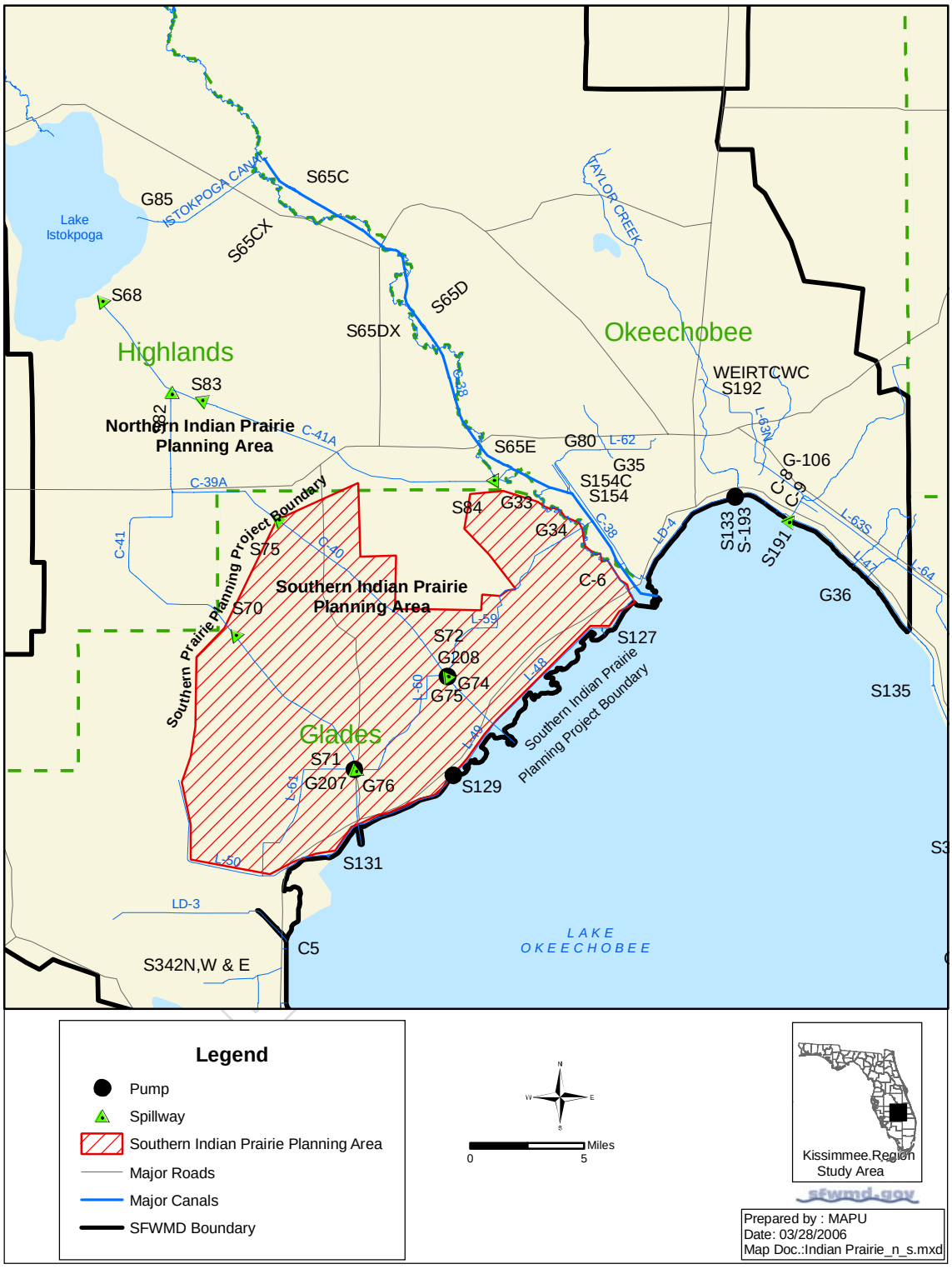

Figure 2. Lake Istokpoga–Southern Indian Prairie Planning Area.

OTHER RELATED STUDIES AND PROJECTS

Kissimmee Chain of Lakes Long Term Management Plan

The Kissimmee Chain of Lakes Long-Term Management Plan was initiated in April 2003 by the SFWMD Governing Board to work with the U.S. Army Corps of Engineers (USACE) and stakeholders to develop a long-term management plan for the Kissimmee Chain of Lakes. The intent of this plan is to improve, enhance and/or sustain lake ecosystem health while balancing impacts to the Kissimmee River and downstream ecosystems, such as Lake Okeechobee.

The proposed scope of the Kissimmee Chain of Lakes Long-Term Management Plan was based on water resources issues in the Upper Kissimmee Basin. After identifying these issues and current initiatives, the partner agencies identified goals to address concerns aligned with the District mission as defined by the SFWMD resolution. Among these goals are: hydrologic management; habitat preservation and enhancement; aquatic plan management; water quality improvement; water supply and recreation and public use (SFWMD *et al*. 2004).

This modeling and public review process is currently underway. Recommendations for modifying operational schedules for the structures located in the upper basin are planned for submission to the Army Corps by the end of 2007. Considered in these recommendations will be a balancing of all the environmental, flood control and water supply expectations on the system.

Lake Okeechobee and Estuary Recovery

The Lake Okeechobee and Estuary Recovery (LOER) Plan has been developed to improve water quality, expand water storage, facilitate land acquisition and enhance the ecologic health of Lake Okeechobee and St. Lucie and Caloosahatchee estuaries. The LOER Plan includes five "Fast-Track" construction projects and numerous interagency initiatives to provide short-term relief and long-term protection. Planned construction projects in or adjacent to the KB Planning Area include the Taylor Creek Reservoir and Nubbin Slough Stormwater Treatment Area (STA) Expansion and Lakeside Ranch STA. The LOER Plan involves the continued implementation of the Lake Okeechobee Protection Program (LOPP) and the CERP Lake Okeechobee Watershed Project (LOWP).

Governor Jeb Bush unveils LOER Program

The U.S. Army Corps of Engineers is expediting modifications to the Lake Okeechobee regulation schedule and the SFWMD is developing rules to modify its water shortage plans. The Critical Project Pilot STAs at Nubbin Slough and Taylor Creek are complete. Although these projects are water quality improvement projects, and not for water supply, they impact the timing of water availability from water sources close to these projects.

Additionally, in April 2006, an engineering study assessing the condition of the Herbert Hoover Dike around Lake Okeechobee was completed for the District. The study's findings included an opinion that the dike does not meet current dam safety standards, and that internal erosion caused by seepage through the earthen structures is affecting the dike. High lake levels are believed to significantly increase this internal erosion. Recommendations for addressing these conditions include fast-tracking repairs to the dike by the U.S. Army Corps of Engineers, and lowering lake levels to minimize seepage. Although lowered lake levels have the potential to improve water quality and habitat conditions in the lake, they also reduce the water supply available from the lake for agriculture and public supply.

The SFWMD is responsible for implementing the statutory provisions in Section 373.042 (1), F.S., requiring the establishment of minimum flows and levels (MFLs) for surface waters and aquifers. The minimum flow is defined at the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. The minimum level is defined as the limit at which further withdrawals would be significantly harmful to the resources of the area.

Section 40E-8.021 (24), F.A.C., defines *significant harm* to be the temporary loss of water resource functions that takes more than two years to recover.

Section 373.0421, F.S., further requires that once the MFL technical criteria have been established, the District must develop and expeditiously implement a recovery and prevention strategy for those water bodies that are currently exceeding, or are expected to exceed, the MFL criteria.

Chapter 40E-8, F.A.C., (SFWMD) and Chapter 40C-8 (SJRWMD) contain the MFLs and criteria for specific water bodies and aquifers within the respective Districts and also include the recovery and prevention strategies for each MFL. Additional MFL protection is identified in Chapter 40E-2, F.A.C., as consumptive use permitting criteria for MFLs, and in Chapters 40E-21 and 40E-22, F.A.C., as water shortage criteria for MFLs.

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CHAPTER 4
Issue Identification

Water users in the Kissimmee Basin Planning Area are challenged with meeting water supply demands, which are expected to increase by greater than 50 percent by 2025, to an estimated 530 million gallons of water per day. The South Florida Water Management District (SFWMD) is tasked with balancing the needs of the environment with those of the public. As part of this effort, the District is required to set environmental limits on traditional sources of water where its use conflicts with protection of the environment. Where traditional sources appear to be limited, the region's water users and the District are expected to identify and assist in developing alternative water supplies (AWS), where available.

The common objective of water supply stakeholders in the Kissimmee Basin Planning Area is identification and introduction of new sources of water to supplement traditional resources serving the region. This chapter examines the water supply planning issues facing the entire Kissimmee Basin region through 2025, including issues related to alternative water supply development.

LIMITED TRADITIONAL SOURCES REQUIRE DEVELOPMENT OF ALTERNATIVE WATER SOURCES

[@ Add map highlighting split district boundaries in final draft.]

The northern half of the Kissimmee Basin has historically relied upon ground water from the Floridan Aquifer as its primary water source. However, this relatively inexpensive natural resource cannot satisfy the region's growing demands, especially in light of environmental constraints. To meet projected demands, the District has identified possible alternative water source options for the region. Water reuse, surface water and stormwater recharge are currently the area's main options. However, each alternative water source's development will take time and planning to assure availability will coincide with potable and non-potable demands.

In the southern half of the Kissimmee Basin, sufficient surface water supply has been identified to meet area needs, except in those instances beyond the 1-in-10 year drought level of certainty. However, the amount of water available for annual allocation is limited and still subject to shortage under drought conditions. To address extreme drought events, the District is investigating Aquifer Storage and Recovery (ASR) as well as reservoir options for local water users.

Lake Istokpoga Regulation Schedule

Surface water from Lake Istokpoga is the traditional source of water used to meet irrigation demands within the Indian-Prairie Basin located in portions of Highlands and Glades counties. Historically, water availability was limited by storage issues and the conflicts inherent in management for flood control, causing temporary water shortages. Due to the limitations on surface water, the Indian-Prairie Basin area was designated a "Restricted Allocation Area" limiting the use of surface water resources (Rule 40E-2.091, F.A.C.; Basis of Review for Water Use Permit Applications, Section 3.2.1., Part A).

The assessment of the available supply from Lake Istokpoga, under current and proposed regulation schedules demonstrates sufficient water is available to meet current and projected 2025 agricultural needs in both the upper and lower portions of the basin during most periods. But, during periods of more severe droughts, it will be necessary to supplement water supplies with water from Lake Okeechobee to meet demands in the southern portion of the Indian-Prairie Basin, including the needs of the Seminole Tribe's Brighton Entitlement.

The use of water from Lake Okeechobee is still being modeled as of the date of this Plan Update's release, along with other demands proposed for the lake as part of the South Florida Water Management Model (SFWMM). In order to efficiently use pumps G-207 and G-208 to make deliveries from Lake Okeechobee, a coordinated plan of operation is proposed for the pumps and other basin structures when water supply from Lake Istokpoga is insufficient to meet all of the basin needs. Development of this operational plan is proposed after modeling of Lake Okeechobee has been completed and the revised schedule has been adopted. Under the operational plan, Lake Istokpoga is proposed to remain the primary source to meet the entire demand within the Indian-Prairie Basin. This update recommends that water shortage actions needed to address water supply during these drought periods be established.

Lake Okeechobee Regulation Schedule Review

Since 1991, when pumps G-207 and G-208 were installed by the District to withdraw water from Lake Okeechobee and deliver it to the southern portion of the Indian-Prairie Basin, the level of Lake Okeechobee fell to a depth below 10 feet mean sea level (MSL) during a time when water was needed for this purpose. This occurrence happened in 2000 when a drought of 1-in-200 years covered the area. Below the depth of 9.6 ft MSL, the production capacity for both pumps is greatly diminished.

The U.S. Army Corp of Engineers (USACE) is expediting modifications to the Lake Okeechobee Regulation Schedule and developing rules to modify its water shortage plans. Adjustments to the schedule may include the lowering of lake levels. Once the lake level falls below 10 feet (MSL), operation of pumps at G-207 and G-208 will be impacted, as these pumps are limited in the ability to pump water below a lake elevation of 9.6 feet MSL. Modeling for Lake Okeechobee operations management is underway at

the time of the drafting of this plan. Modeling and recommendations for modifying the current operation schedule are expected by the end of 2006.

Regional Reservoir Construction

Another emerging issue for the Kissimmee Basin Planning Area is the proposed regional storage basins to be located north of Lake Okeechobee. The basins will to store and treat water prior to entry into the lake. Collectively, these Stormwater Treatment Areas (STAs) may be as large as 40,000 acre-feet in size and represent a potential new alternative water source. A reservoir within the Indian-Prairie Basin has been identified through a preliminary screening process as a possible site for the STA construction. The new reservoir will be designed to accept water from Lake Istokpoga and the Kissimmee River for the purposes of water quality treatment and temporary storage. While the proposed STA is likely to improve water supply availability for portions of the Kissimmee Basin, it is difficult to quantify its impact at this point in time. Construction of this reservoir is anticipated to be completed after 2011.

Kissimmee Chain of Lakes Management

The Kissimmee Chain of Lakes and the Kissimmee River represent the largest surface water collection system within the Planning Area; and, both sources represent significant water inflow into Lake Okeechobee. This system may also represent the single largest untapped alternative water supply source for the northern Kissimmee Basin Planning Area. At present, the Kissimmee River system is undergoing a major restoration, which will also require water to be stored and released in the Kissimmee Chain of Lakes and its tributaries.

To address the issue of how much potential water is needed for the current restoration effort and how much is available for consumptive uses, the District is developing the Kissimmee Chain of Lakes Long-Term Management Plan. The plan also intends to address temporary deviations for aquatic plant management. The long-term plan is being developed as part of a multi-agency effort, which includes participation by other state agencies, local governments, environmental agencies and the public. The completed plan will recommend lake management options to the U.S. Army Corps of Engineers (USACE) which will best balance the many demands on the lake and river system and help define water supply availability for consumptive uses.

Options — Water Reuse and Conservation

Central Florida has been a reclaimed water use leader for more than 20 years. In 2001, the 19 major wastewater utility providers within and surrounding the Kissimmee Basin Planning Area generated just over 122 MGD of reclaimed water suitable for reuse. Additional reclaimed water was directed to surface water discharge or storage ponds in low recharge/discharge areas. By the year 2025, projected reclaimed water flows are expected to exceed 243 MGD, an increase of 125 MGD, by the year 2025. Demands for

non-potable needs are estimated to exceed 260 MGD over the same period for the portions of Orange, Osceola and eastern Polk counties located within the SFWMD's jurisdiction. Residential landscape irrigation represents the largest water user category demanding reclaimed water over the coming years.

Over the last few years reclaimed water has been defined more as a valuable resource as opposed to discharge in need of disposal. With this new understanding is the need to address efficient use of the resource. Addressing conservation in the reclaimed water system is an important part of meeting the future demand needs for the northern Kissimmee Basin Planning Area and surrounding region. The development of supplemental sources for reclaimed water supply is the second component needed to maximize the amount of reclaimed water available to delivery.

Aquifer recharge is also an important component for effective use of the reclaimed water system in central Florida. For over 20 years the Conserv II and similar projects have been recharging highly treated reclaimed water to the Floridan Aquifer through the use of Rapid Infiltration Basins (RIBs). The effective recharge of the Floridan Aquifer and mitigation of shallow aquifer drawdown is considered a very beneficial aspect of water reuse. Efforts to identify effective locations for beneficial recharge to the Floridan Aquifer using reclaimed water warrants further investigation.

ENVIRONMENTAL PROTECTION FOR NATURAL SYSTEMS

Wetland Protection

There are significant areas in western Orange and Osceola counties where the confining layer between the Floridan and Surficial Aquifer is thinned and where the potential for wetland impacts are greatest. In these areas, withdrawals from the Floridan may induce lower water levels in the Surficial Aquifer. Wetland impacts are a significant water supply concern in the northern basin.

Aquifer Protection from Saltwater Intrusion

Saltwater intrusion is an important issue for eastern Orange County. An existing public water supply wellfield is located near the interface between fresh and saltwater zones in the aquifer. The location of the saltwater interface in the proximity of existing and potential users constrains the availability of water for allocation. Declines in the Floridan Aquifer level, caused by cumulative withdrawals, have the potential to cause movement of this saltwater interface. Interdistrict cooperation is needed to prevent harm to the aquifer resulting from saltwater intrusion.

Protection of Lakes Along the Lake Wales Ridge

The Lake Wales Ridge is an environmentally sensitive area characterized by isolated lakes and wetland systems. The Southwest Florida Water Management District (SWFWMD) has established minimum flows and levels (MFLs) for several lakes in the area to limit consumptive use withdrawals, which could adversely impact the water bodies. The SWFWMD relies upon inter-district cooperation with the SFWMD to prevent harm to the lakes along the Ridge.

Protection of Spring Discharges in the Wekiva Basin

Minimum flows and levels have been set for eight springs in the Wekiva Basin by the St. Johns River Water Management District (SJRWMD). **Figure 1** presents the location of springs within the SJRWMD's jurisdiction. Avoidance of impacts caused by cumulative water withdrawals from the Floridan Aquifer is a significant issue for the central Florida region. Interdistrict cooperation is also needed between the SFWMD and SJRWMD to prevent harm to these springs.

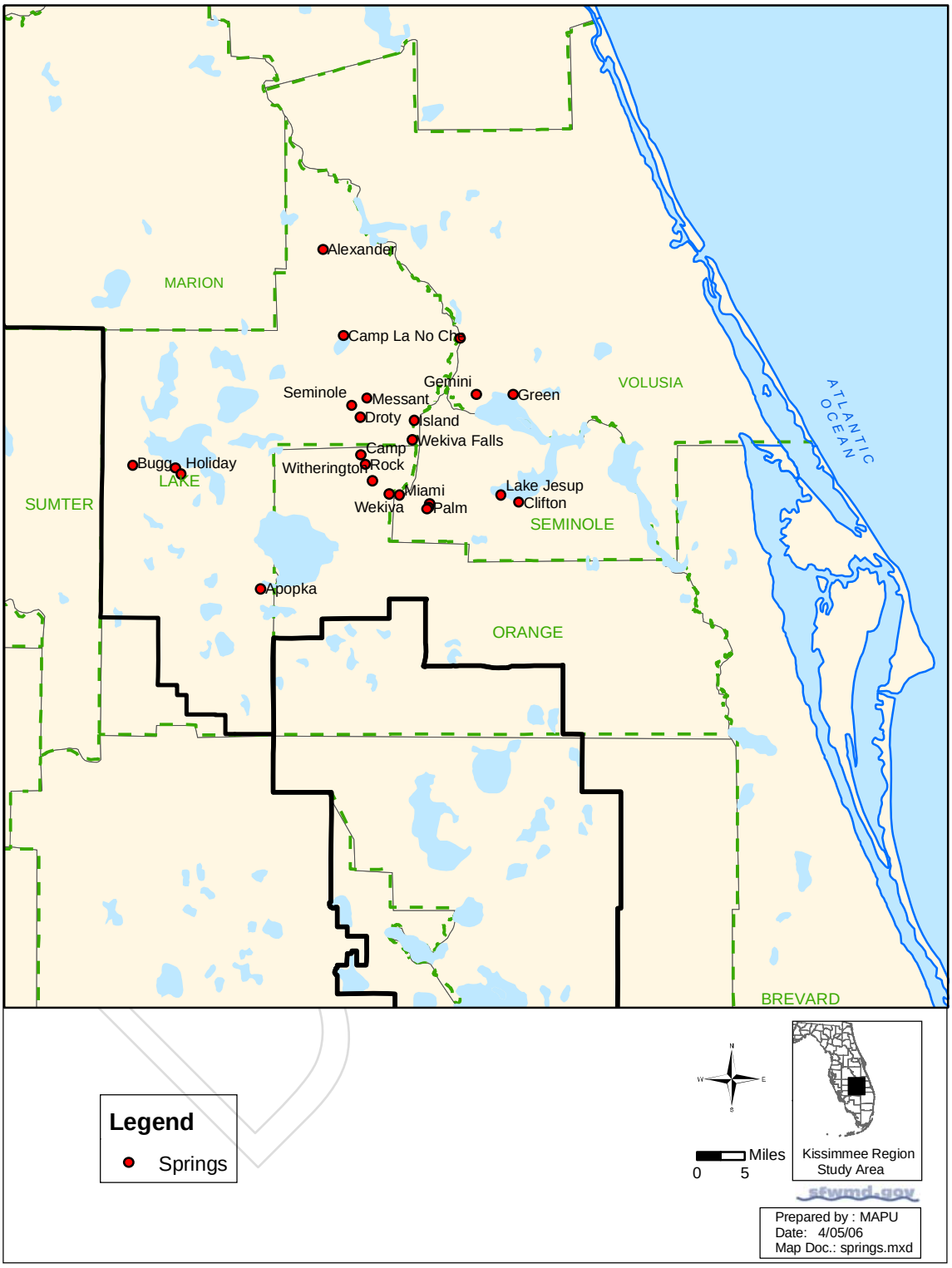

Figure 1. Springs within the St. Johns River Water Management District.

Kissimmee River Restoration and Kissimmee Chain of Lakes Preservation

Sen. Bob Graham and the late Gov. Lawton Chiles join the groundbreaking celebration as the first backfill is deposited in the C-38 Canal for the Kissimmee River Restoration Project.

Between 1962–1971, as part of the Central and Southern Florida Flood Control Project, the meandering Kissimmee River and flanking floodplain were channelized and thereby transformed into a 30-foot deep central drainage canal. This drainage canal is compartmentalized with levees and dam-like water control structures into a series of five relatively stagnant pools.

The Kissimmee River restoration initiative began as a grassroots movement during the latter stages of channelization when concerned citizens and members of the environmental community voiced concerns regarding perceived environmental impacts of the flood control project. Subsequent studies documented the nature of these impacts to the Kissimmee River and its surrounding ecosystem, which include the loss of 30,000–35,000 acres of wetlands, a tremendous reduction in wading bird and waterfowl inhabitants and a continuing long-term decline in game fish populations. These impacts provided the impetus for over 20 years of state and federally mandated restoration related studies, which culminated in the development of a restoration plan that was authorized for implementation as a state/federal partnership in the 1992 Water Resources Development Act. The restoration project will restore over 40 square miles of river and associated floodplain wetlands, and will benefit over 320 fish and wildlife species, including the endangered bald eagle, wood stork and snail kite.

The Kissimmee River Restoration is a long-term goal of the SFWMD that will exceed $500 million in costs when completed. In 2006, the District acquired the last of the 102,061 acres needed to achieve the river's restoration, land both within the river basin and within the area surrounding the Kissimmee Chain of Lakes. As part of the effort to restore the river, the District must balance several water resource related objectives. Among these objectives are flood controls, environmental resources both in the river and downstream in Lake Okeechobee, aquatic plant management, water quality, and water supply for consumptive uses.

As the restoration effort proceeds, some positive changes have already been observed. Sandbars and a sandy river bottom are emerging as signs of improvement in the rivers' hydrology. In formerly isolated sections of the river, oxbows are flowing again. Emergent and shoreline vegetation has reappeared and is thriving. Waterfowl are returning and water quality is improving.

ADDITIONAL ISSUES

Split Water Management District Responsibilities

The water resources in central Florida metro-area are affected by the management decisions made by three water management districts. The St. Johns River Water Management District (SJRWMD) manages water resources in the northern half of Orange County, and Seminole and Lake counties. The South Florida Water Management District (SFWMD) manages the southern half of the municipal area, which includes portions of Polk and Osceola counties, and southern Orange County. In addition, the SFWMD shares a common boundary with the Southwest Florida Water Management District (SWFWMD) to the west of the Kissimmee Basin Planning Area. A growing population along this area is searching for alternative water supply solutions, some of which are proposed within the SFWMD's jurisdiction within the Kissimmee Basin Planning Area. Polk County lies within both SWFWMD and SFWMD.

The groundwater basin for the Floridan Aquifer System covers the entire Kissimmee Basin and links the water supply for all the users in the region. Thus, the identification of water supply issues and solutions requires a cooperative and coordinated effort between all three water management districts.

Transferring Water between Water Management Districts

Interdistrict transfer is an important issue facing Central Florida and those counties located along the Lake Wales Ridge. Several alternative water supply options have been identified to make withdrawals from or import to the Kissimmee Basin Planning Area. The issue has been addressed by law under Section 373.2295, F.S., but has had limited implementation. Under Section 373.2295, F.S., interdistrict transfers are defined to include proposed withdrawals of groundwater from one water management district for use outside that district's boundaries; however, they do not include withdrawals within a single county. If a cross water management district boundary transfer occurs within a single county, then the public interest test described below applies, but the procedures do not.

Section 373.2295, F.S., requires the water management district in which the withdrawal is proposed to occur to review the consumptive use permit application. In addition to meeting the typical requirements related to reasonable-beneficial use and interference with existing legal users, users are required to satisfy a unique public interest test. In determining whether such a proposed transfer is consistent with the public interest, the reviewing water management district is to refer to the projected populations, as contained in future land use elements of the comprehensive plans of both the withdrawal and use areas together with other evidence on future needs of both areas. Section 373.2295(4), F.S. states that the proposed interdistrict transfer of groundwater will meet the public interest test: "…if the needs of the area where the use will occur and the specific area from which the groundwater will be withdrawn can be satisfied…."

A second significant definition of the consumptive use permit "public interest" test affecting long distance transport of water was adopted with the amendment of Section 373.223(3), F.S. which became known as the "local sources first" statute. It applies when transport of either ground or surface water across county boundaries is proposed, but not when crossing water management district boundaries. In such applications, the water management district is to consider a variety of public interest factors. For example, the factors include consideration of sources that are closer to the area of use; alternatives to the proposed source, including alternative technologies such as desalination; potential environmental impacts; and whether sources are adequate to supply water for existing legal uses and reasonably anticipated future needs of the planning region where the proposed source is located.

DEP regulations require that both the sending and the receiving water management districts approve a proposed interdistrict transfer of surface water. The special public interest considerations that must be met include water conservation measures and reuse implementation in the receiving area, the costs and benefits and environmental impacts that may occur in both areas, and the present and future needs of the supplying area and whether these needs can be expected to be met.

As Florida's population continues to grow, the development of consensus on resource issues and conditions, and projected future needs along district boundaries is expected to become increasingly important.

Southern Indian Prairie Basin Water Supply Limitation

Under the 2000 KB Plan, an analysis was performed to assess the ability of the G-207 and G-208 pump stations to provide water from Lake Okeechobee into the Indian-Prairie Basin during a 1-in-10 year drought. This analysis was updated as part of the 2005–2006 planning effort. It confirmed that water from Lake Istokpoga was available to meet the projected 2025 1-in-10 year drought demands, but indicates that water from Lake Okeechobee is needed to meet demands during more severe drought events.

The U.S. Army Corps of Engineers, along with the SFWMD and other stakeholders, are participating in an inter-agency study team to implement a new Lake Okeechobee Regulation Schedule. This new lake schedule may allow levels in Lake Okeechobee to fall below 10 feet MSL more frequently. Managing Lake Okeechobee at this level increases the risk of Lake Okeechobee dropping below 9.6 feet MSL at which point the pumps G-207 and G-208 are unable to withdrawal water from Lake Okeechobee. Concerns have been raised by the Seminole Tribe and other stakeholders in the southern Indian-Prairie Basin about the dependability of Lake Okeechobee when droughts occur. Securing a dependable source of water for the Brighten Reservation is of particular importance as the Tribe's water rights are protected by Entitlement. Other avenues of making supply deliveries to agricultural operations in the southern basin are being reviewed and include Aquifer Storage and Recovery, local reservoirs and deliveries of water from the Kissimmee River. All of these solutions, however, raise issues still

needing resolution. The new Lake Okeechobee Regulation Schedule is scheduled for January 2007.

LOCAL GOVERNMENT RESPONSIBILITIES TO IMPLEMENT GROWTH MANAGEMENT

New Connections to Local Government Comprehensive Plans

During the 2002 through 2005 legislative sessions, direct statutory linkages were created for the first time between the water supply planning done by water management districts and the land use planning carried out by local governments throughout the state. In general, the changes coordinate local government land use with regional water supply plans, and establish a closer link between development decisions and the availability of water and public facility planning and funding.

Besides a general requirement to coordinate with regional water supply plans, some of the specific water supply related connections under the new law that now must be addressed in local government comprehensive plans include:

- General Requirement: Identify water supply sources needed to meet existing and projected water use demands for the established planning period of the comprehensive plan [s. 163.3167(13), FS].
- Future Land Use Element: Future land uses are to be based on the availability of water supplies, population projections and associated public facilities [s. 163.3177(6)(a), FS].
- Potable Water Element: The element must [s. 163.3177(6)(c)]:
    - Identify alternative and traditional water supply projects, conservation and reuse needed to meet the water needs identified in the regional water supply plan for the local government's jurisdiction.
    - Within 18 months following an approved update of the regional water supply plan,
        - Incorporate water supply projects from those identified in the regional water supply plan, or propose alternatives.
        - Include a minimum 10-year work plan for building all public, private, and regional water supply facilities needed to serve existing and new development.
- Evaluation & Appraisal Report (EAR): Include an analysis of the implementation of the 10-year work plan for building all water supply facilities within the local government's jurisdiction [s. 163.3191(2)(l), FS].